Malheur Invasive Plant Treatment EIS

Final
Botanist's Report
and
Biological Evaluation

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Sensitive plants, culturally significant plants, and special forest products

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Introduction

This report evaluates the potential effects from the proposed Malheur National Forest invasive plants treatment draft environmental impact statement alternatives to fungal, lichen, and plant species that are federally listed as threatened, endangered, or proposed for federal listing under the Endangered Species Act of 1973, as amended, and also to fungal, lichen, and plant species identified as sensitive on the regional forester's special status species list (USDA Forest Service 2011). These organisms will be collectively referred to as sensitive plant species (also called botanical species of conservation concern in some portions of the DEIS). In addition, this section addresses potential effects to plants which are culturally significant to local Native American tribes, and special forest products (non-timber forest products).

Forest Service designated sensitive species, and federally listed threatened, endangered, and proposed species

This analysis addresses plant species designated as sensitive on the Region Six Regional Forester's Special Status Species List (USDA Forest Service 2011). Forest Service Manual 2670.5 defines sensitive species as those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers, density, or habitat capability that would reduce a species existing distribution. The list of regionally designated sensitive species includes vascular plants, non-vascular plants (mosses and liverworts), lichens, and fungi. These will be collectively referred to here as sensitive plants. There are currently 88 species of sensitive plants documented, or suspected to occur, on the Malheur National Forest. All federally proposed, listed endangered or listed threatened species (as defined by the Endangered Species act of 1973) are included on the Regional Forester's Sensitive plant list. Effects analysis determinations follow definitions as outlined in Forest Service Manual 2672.42.

Analysis Area

The analysis area for this project encompasses the entire 1,459,422 acre Malheur National Forest and 240,000 acres of the Ochoco National Forest that the Malheur National Forest administers. This totals nearly 1.7 million acres. The main counties included in the analysis area are Grant, Baker, and Harney. Also included are small portions of Crook and Malheur Counties.

Project Description

This project proposes measures to suppress, contain, control, and eradicate invasive plants using an integrated approach. Techniques proposed include use of herbicides, mechanical, manual, and biological control agents. Site restoration after invasive species treatments will be achieved through mulching, seeding, and planting of genetically appropriate native plants. Three action alternatives are proposed. Treatments will be implemented on existing and new infestations, including newly discovered invasive plant species that are not currently documented on the forest. See Chapter one of the associated DEIS for a discussion of the history of invasive plant control, and the need for action. See Chapter two of the DEIS for a full description of the various alternatives.

Project design features (PDF's) have been developed to minimize negative environmental effects of the proposed treatments. See Table 9 in chapter two of the DEIS for the list of project design features that will help to protect sensitive plant populations and potential habitat. In particular, see the following sections: F – Herbicide applications, H – Soils, Water, and Aquatic Ecosystems, I - Sensitive Plants, K-Public Notification, and L-Special Forest Products.

Overview of Issues/Elements of the Purpose and Need Addressed

Relevant Issue/Purpose and Need Indicators from Chapter 1

Key Issue (1.10.3 in Chapter 1 of DEIS): "Herbicide Impacts on Nontarget Vegetation and Pollinators"

Issue Statement: Proposed herbicide use may harm nontarget plants and/or pollinators, specifically sensitive species, cultural use plants, and special forest products.

Background: Herbicides are designed to kill plants and there is always a risk that herbicide will affect nontarget botanical species (vascular plants, fungi, algae, lichens, and bryophytes). The presence of sensitive species, treatment extent, rate and method of application and the properties of the chemicals proposed influence the degree of risk.

Issue Measures:

- Type and extent of herbicide use within 100 feet of sensitive plants, culturally significant plants, and special forest products.
- Qualitative assessment about the effectiveness of buffers and other project design features to prevent herbicide from harming nontarget botanical species and pollinators.

This analysis will specifically address potential impacts to Forest Service sensitive plant species, plants which are culturally significant to local Native American tribes, special forest products (non-timber forest products, including food and medicinal plants and mushrooms), and to plant pollinators.

Other Issues (1.10.6 in Chapter 1 of DEIS): "Compliance with existing management direction, permits and other requirements associated with the action, and disclosure of findings and determinations associated with endangered species act consultation."

This botanical report and biological evaluation will fulfill the requirements associated with Endangered Species Act (ESA) consultation, NEPA disclosures, and Forest Service management direction as they relate to sensitive plants, and special forest products.

Affected Environment

Existing Condition

Documented federally listed, proposed, and candidate plant species in and near the planning area

The USDI-FWS website indicates that white bark pine (*Pinus albicaulis*) occurs in Baker and Grant County. This species is currently a candidate for federal listing. White bark pine is found in subalpine habitats, usually near timberline (above 6,500 feet altitude). The plant association group where it occurs is cold upland coniferous forest. Sites are usually fairly dry, with thin,

rocky, cold soils. It occurs at high elevations (6,500 feet) throughout western North America. It is found from Canada south to central California, east to Wyoming and Colorado. It occurs on all Blue Mountain Forests, including at scattered sites on the Malheur NF. Very few documented invasive plant sites occur in high elevation dry sites. Therefore, it is unlikely that any invasive plant treatments will occur in areas where white bark pine is found.

The USDI-FWS website indicates that Malheur wire lettuce (*Stephanomeria malheurensis*) occurs in Harney County. This species is federally listed as endangered. It is found in a very limited area 35 miles south of the southern boundary of the Malheur National Forest. It grows only on volcanic tuffaceous soils. It is highly unlikely that there is any potential habitat for this species on the Malheur National Forest.

The USDI-FWS website indicates that Howell's spectacular thelypody (*Thelypodium howellii* ssp. *spectabilis*) occurs in Baker County. This species is federally listed as threatened. It is found in a very limited area of the Baker valley. The closest known population is over thirty five miles northeast of the Malheur National Forest. This species grows only at relatively low elevations on moist alkaline plains, and in alkaline river valleys. It is usually found with black greasewood (*Sarcobatus vermiculatus*). All Malheur National Forest land in Baker County is in relatively high elevation in forested or open sub alpine habitat types. It is highly unlikely that there is any potential habitat for this species on the Malheur National Forest.

The USDI-FWS website does not list any plants for Crook County.
The USDI-FWS website does not list any plants for Malheur County.

Existing Condition Sensitive Plants

The following sources of information were used to determine which sensitive plant species, and their respective habitats, may occur within the project area.

- The Regional Forester's Sensitive Species List (USDA Forest Service 2011)
- The Forest Service's Natural Resource Manager Database (NRM) – Threatened, endangered, and sensitive species geographic information system (GIS) database, and other pertinent GIS mapping layers (potential natural vegetation, streams and wetlands, aerial imagery).
- Project GIS layer showing proposed treatment areas

Known Sensitive Plant Populations in Project Area

Table 1: Sensitive plant populations within 100 feet of proposed invasive treatment areas

5th field Watershed	Sensitive Plant Species	Invasive Species	Distance between species
Bridge Creek - 1707020301	Blandow's feather moss (*Helodium blandowii*)	Hound's tongue (*Cynoglossum officinale*)	30 feet – 1 site
Fields Creek John Day River - 1707020110	Colonial luina (*Luina serpentina*)	Dalmation toadflax (*Linaria dalmatica*)	57 feet – 1 site
		Spotted knapweed (*Centaurea stoebe ssp. micranthos)*	51 feet – 1 site
Headwaters Silvies River - 1712000201	Crenulate moonwort (*Botrychium crenulatum*)	Canada thistle (*Cirsium arvense*)	54 feet – 1 site
Upper Silvies River - 1712000203	Idaho sedge (*Carex idahoa*)	Canada thistle (*Cirsium arvense*)	0 feet – 1 site
		Hound's tongue (*Cynoglossum officinale*)	0 feet – 1 site
	Deschutes milk vetch (*Astragalus tegetarioides*)	Dalmation toadflax (*Linaria dalmatica*)	0 feet – 3 sites
Middle Silvies River - 1712000204	Deschutes milk vetch (*Astragalus tegetarioides*)	Spotted knapweed (*Centaurea stoebe ssp. micranthos)*	0 feet – 1 site
		White-top (*Cardaria draba*)	79 feet – 1 site
Emigrant Creek - 1712000205	Peck's long-bearded sego lily (*Calochortus longebarbatus* var. *peckii*)	Yellow toadflax or Butter-and-eggs (*Linaria vulgaris*)	0 feet-3 sites
North Basin - 1712000101	Deschutes milk vetch (*Astragalus tegetarioides*)	Dalmation toadflax (*Linaria dalmatica*)	0 feet – 1 site

Potential Sensitive plant species within the project area

Table 2 – Malheur National Forest Sensitive Plant Species lists all Region Six sensitive plant species which are documented or suspected to occur on the Malheur National Forest.

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Table 2. Sensitive Plant Species listed for the Malheur National Forest

Malheur National Forest Sensitive Plant Species			
Taxa Type	**Scientific Name**	**Common Name**	**Occurrence on the Forest[1]**
Fungus	*Pseudorhizina californica*	umbrella false morel	S
Lichen	*Texosporium sancti-jacobi*	woven spore lichen	S
Liverwort	*Anastrophyllum minutum*	tiny notchwort	S
Liverwort	*Anthelia julacea*	alpine silverwort	D
Liverwort	*Barbilophozia lycopodioides*	giant fourpoint, maple liverwort, greater pawwort	S
Liverwort	*Harpanthus flotovianus*	great mountain flapwort	S
Liverwort	*Jungermannia polaris*	Arctic flapwort	S
Liverwort	*Lophozia gillmanii*	Gillman's pawwort	S
Liverwort	*Peltolepis quadrata*	shieldscale liverwort	S
Liverwort	*Preissia quadrata*	blister ribbon, narrow mushroom-headed liverwort	D
Liverwort	*Ptilidium pulcherrimum*	lovely fuzzwort, naugahyde liverwort	S
Moss	*Encalypta brevipes*	candle snuffer moss, stubby extinguisher moss	S
Moss	*Entosthodon fascicularis*	banded cord-moss, Hasselquist's hyssop	S
Moss	*Helodium blandowii*	Blandow's feather moss, wet plume moss	D
Moss	*Meesia uliginosa*	Meesia moss	D
Moss	*Pseudocalliergon trifarium*	blunt water moss, worm moss	S
Moss	*Schistidium cinclidodonteum*	schistidium moss	S
Moss	*Schistostega pennata*	schistostega moss	S
Moss	*Splachnum ampullaceum*	purple-vased stink moss, small capsule dung moss	S
Moss	*Tetraphis geniculata*	tetraphis moss	S
Moss	*Tomentypnum nitens*	tomentypnum moss	D
Moss	*Tortula mucronifolia*	mucron-leaf tortula moss	S
Vascular	*Achnatherum hendersonii*	Henderson's ricegrass	S
Vascular	*Achnetherum wallowaense*	Wallowa ricegrass	S
Vascular	*Artemisia arbuscula* ssp. *longicaulis*	Lahontan sagebrush	S
Vascular	*Astragalus tegetarioides*	Deschutes milkvetch, bastard milkvetch	D
Vascular	*Botrychium ascendens*	upward-lobed moonwort	D
Vascular	*Botrychium crenulatum*	crenulate moonwort	D
Vascular	*Botrychium hesperium*	western moonwort	S
Vascular	*Botrychium lineare*	slender moonwort	S

Malheur National Forest Sensitive Plant Species			
Taxa Type	**Scientific Name**	**Common Name**	**Occurrence on the Forest[1]**
Vascular	*Botrychium lunaria*	common moonwort	D
Vascular	*Botrychium montanum*	mountain moonwort	D
Vascular	*Botrychium paradoxum*	twin-spiked moonwort	S
Vascular	*Botrychium pedunculosum*	stalked moonwort	S
Vascular	*Bupleurum americanum*	American thorough-wax	S
Vascular	*Calochortus longebarbatus* var. *longebarbatus*	long-bearded sego-lily	S
Vascular	*Calochortus longebarbatus* var. *peckii*	Peck's long-bearded sego-lily	D
Vascular	*Camissonia pygmaea*	dwarf evening-primrose	S
Vascular	*Carex atrosquama*	blackened or brass-fruit sedge	S
Vascular	*Carex cordillerana (Carex backii)*	cordilleran sedge	D
Vascular	*Carex diandra*	lesser panicled sedge	S
Vascular	*Carex idahoa*	Idaho sedge	D
Vascular	*Carex lasiocarpa* var. *americana*	slender wooly sedge	S
Vascular	*Carex media*	Scandinavian sedge	S
Vascular	*Carex micropoda*	timberline sedge	S
Vascular	*Carex nardina*	spikenard sedge	S
Vascular	*Carex pelocarpa*	dusky-seed or new sedge	S
Vascular	*Carex retrorsa*	retrorse sedge	S
Vascular	*Carex saxatilis*	russet sedge	S
Vascular	*Carex scirpoidea* ssp. *stenochlaena*	Alaska single-spiked sedge	D
Vascular	*Carex subnigricans*	nearly black or dark alpine sedge	S
Vascular	*Carex vernacula*	native sedge	S
Vascular	*Chaenactis xantiana*	desert chaenactis	S
Vascular	*Cheilanthes feei*	Fee's lip fern	S
Vascular	*Cistanthe rosea (Calyptridum roseum)*	rosy pussypaws	H
Vascular	*Cryptogramma stelleri*	Steller's rock-brake	S
Vascular	*Cymopterus nivalis*	snowline cymopterus	D
Vascular	*Cypripedium fasciculatum*	clustered lady's-slipper	S
Vascular	*Elatine brachysperma*	short-seeded waterwort	S
Vascular	*Eleocharis bolanderi*	Bolander's spike-rush	D
Vascular	*Eriogonum cusikii*	Cusick's buckwheat	S
Vascular	*Eriogonum salicornioides*	playa or saltwort buckwheat	S
Vascular	*Heliotropium curassavicum*	salt heliotrope	S
Vascular	*Kobresia myosuroides*	Bellard's kobresia	S
Vascular	*Listera borealis*	northern twayblade	D
Vascular	*Lomatium erythrocarpum*	red-fruited desert-parsley	S
Vascular	*Luina serpentina*	colonial luina	D

Malheur National Forest Sensitive Plant Species			
Taxa Type	**Scientific Name**	**Common Name**	**Occurrence on the Forest[1]**
Vascular	*Lupinus cusickii* var. *cusickii*	Cusick's lupine	S
Vascular	*Lycopodium complanatum*	ground-cedar	S
Vascular	*Mimulus evanescens*	disappearing monkey-flower	H
Vascular	*Muhlenbergia minutissima*	annual or little-seed muhly grass	S
Vascular	*Ophioglossum pusillum*	adder's-tongue	D
Vascular	*Pellaea bridgesii*	Bridge's cliff-brake	S
Vascular	*Phacelia minutissima*	least or dwarf phacelia	D
Vascular	*Phlox hendersonii*	Henderson's phlox	S
Vascular	*Phlox multiflora*	many-flowered phlox	S
Vascular	*Pinus albicaulis*	whitebark pine	D
Vascular	*Pleuropogon oregonus*	Oregon semaphore grass	S
Vascular	*Potamogeton diversifolius*	diverse-leaved pondweed	S
Vascular	*Rotala ramosior*	lowland toothcup	S
Vascular	*Salix farriae*	Farr's willow	S
Vascular	*Salix wolfii*	Wolf's willow	S
Vascular	*Saxifraga adscendens* ssp. *oregonensis*	wedge-leaved saxifrage	S
Vascular	*Stanleya confertiflora*	biennial stanleya	S
Vascular	*Thelypodium eucosmum*	arrow-leaf thelypody	D
Vascular	*Trifolium douglasii*	Douglas' clover	S
Vascular	*Trollius laxus* ssp. *albiflorus*	American globeflower	S
Vascular	*Utricularia minor*	lesser bladderwort	S

[1]D=Documented, H=Historical Records, S=Suspected

Historical Botanical Surveys

The Forest Service Natural Resource Manager (NRM) record keeping system is relatively new, and many old survey records have not been entered or mapped in GIS. Most of the areas proposed for invasive species treatment have not had sensitive plant botany surveys conducted in those specific locations. Many of the invasive species inventories were conducted by personnel who were trained to look for specific invasive species; these personnel are not always qualified to conduct sensitive plant surveys. So, although the invasive species documented sites show up as "inventoried" on the GIS layer, these inventories were only for the invasive species, not for sensitive species.

Field Surveys Conducted for this project

Project design features for this project stipulate that site specific surveys for sensitive plants will be conducted prior to project implementation. In areas with high potential habitat for sensitive plant species, a Forest Service botanist or otherwise qualified person will examine all areas of potential ground disturbance and/or herbicide application at the appropriate time of the year to identify targeted sensitive plant species before implementation. Sensitive plant surveys were conducted in 2013 in some selected locations targeted for treatment in this DEIS. No overlap

between sensitive plant populations and invasive plant populations were found during these surveys (NRM database, 2013).

Existing Condition Culturally Significant Plants

Traditional cultural plants such as bitterroot (*Lewisia rediviva*), biscuitroot (*Lomatium spp*.), camas (*Camassia quamash*), chokecherry (*Prunus emarginata*), and huckleberry (*Vaccinium membranaceum*) are found in the project area. These and other culturally important plants are collected and used by both Native American tribal members and the general public as food, medicine, or for use in ceremonial activities. These species occur in various habitats across the Forest. These plants may occur in the same general vicinity where invasive species treatments may be implemented. Specific locations where these species occur are not mapped or tracked by the Malheur National Forest. No permits are required to collect these species for personal use.

Existing Condition Special Forest Products

Special forest products include all non-timber products that require a permit for commercial or personal use collecting. This includes firewood, posts and poles, Christmas trees, pine cones, burls, mushrooms, and commercial collecting of medicinal or food plants. Also included are permits for collection of seeds, cuttings, or whole plants for propagation or landscaping. Decorative rocks and rocks for landscaping are also collected under permit. Permits are not required for small quantities of mushrooms (less than one gallon per day), huckleberries, and other roots and fruits. The most common special forest product that is collected on the Malheur National Forest is firewood, followed by posts and poles. Mushroom permits are generally only sold in quantity after wild fires, when morel mushrooms fruit in abundance. Special forest products occur in various habitats across the Forest. These collection activities may occur in the same general vicinity where invasive species treatments may be implemented. Specific locations where these species occur are not mapped or tracked by the Malheur National Forest.

Desired Condition

Desired Condition for Plants in General

Although there are no specific desired conditions outlined in the Land and Resource Management Plan for the Malheur National Forest (MNF Forest Plan 1990) for plants in general, the following desired conditions are proposed for this project.

1. All priority noxious weed infestation on the Forest are inventoried and under a long-term treatment strategy.

2. The vegetation resource will be in a condition capable of supporting the basic needs of native fish, wildlife, and desired introduced species which are dependent upon plants for food and habitat.

3. Desirable native vegetation will inhibit soil erosion, provide nutrients to the soil, and will help to preserve and/or improve water quality.

Desired Condition for Sensitive Plants

The objectives in Forest Service Manual (2670.22) for sensitive species are:

1. Develop and implement management practices to ensure that species do not become threatened or endangered because of Forest Service actions.

2. Maintain viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System lands.

3. Develop and implement management objectives for populations and/or habitat of sensitive species.

The Malheur NF Land and Resource Management Plan does not identify a desired condition for sensitive plants (MNF Forest Plan 1990). However, the following desired conditions are proposed for this project.

1. Sensitive plant species are provided high quality habitat across the planning area.

2. Sensitive plant species populations are well documented and monitored to ensure that Forest Service actions are not contributing a trend towards federal listing.

3. Negative impacts to sensitive plant species and habitat from invasive plants are controlled and/or minimized. Invasive plant treatments are designed and implemented to minimize impacts to sensitive plants.

Desired Condition for Special Forest Products

Chapter 80 of Forest Service Handbook 2409.18 contains direction for the free use or sale of special forest products.

> Trees, portions of trees, and other forest products on National Forest System Lands may be sold for the purpose of achieving the policies set forth in the Multiple Use Sustained Yield Act of 1960, as amended, and the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the National Forest Management Act (1976).

The objective in Forest Service Manual (2467.02) for special forest products is:

> To sell other forest products where it would serve local needs and meet land management objectives.

The Malheur Forest Plan does not identify a desired condition for Special Forest products (MNF Forest Plan 1990). However, the following desired condition is proposed for special forest products:

> Special forest products are managed to provide a sustainable source of those products for both continued viability on the forest and for harvesting of materials in excess of the basic needs of the landscape and other resource needs.

Environmental Consequences

Methodology

Assumptions of Effects Analysis

There are no documented populations or potential habitat on the Malheur National Forest for any federally listed or proposed fungal, lichen, or plant species. Therefore, there should be no effect from any of the alternatives to federally listed or proposed fungal, lichen, or plant species. Hence, consultation with the U.S. Fish and Wildlife Service is not necessary for these species.

The four possible effect calls for sensitive plants are outlined in Forest Service Manual 2670. These definitions were used to guide the determination of effects:

- NI - Species that occur in habitats which are not expected to be directly or indirectly affected in any way, are given a "No Impact" determination.
- BI - Species and their potential habitats that could be favorably affected by a particular alternative are given a determination of "Beneficial Impact".
- MIIH - Species and potential habitat that could possibly be negatively affected are given a determination of "May impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species". This call is used in cases where there is unsurveyed potential habitat, or where potential impacts are uncertain, or considered to be relatively minor.

  This acknowledges that the action could have negative impacts, but due to (1) the complexity of the proposed action, (2) the differential impacts across the landscape and (3) the lack of best available science, the degree and consequence of the negative impacts are not known with certainty. Additionally, this recognizes that even the most substantial impacts of the proposed action will not contribute to a trend toward listing the species under the Endangered Species Act. The effects are expected to be minor enough that they will not cause a loss of viability of the species in the planning area.
- WIFV - Species and habitat that will most likely be negatively affected by the project, a determination of "Will impact individuals or habitat with a consequence that the action may contribute to a trend towards federal listing, or cause a loss of viability to the population or species". This call is used in cases where negative impacts will clearly occur, and they are of a magnitude that they may cross a threshold leading to Federal Listing under the Endangered Species Act.

Since all of the action alternatives include similar activities and project design features, the analysis will focus primarily on a general discussion of potential effects. Then the individual alternatives will be compared in relation to the amount of area, proposed riparian buffers, and various herbicides proposed for treatment under each alternative.

Incomplete and Unavailable Information

Invasive plant sites and known populations of sensitive plant species on the Forest have typically been mapped with an accuracy of 100 feet, or better. Small mapping errors may mean that sites on the ground are actually further apart or closer together than displayed in GIS. Additionally, invasive species and sensitive plant populations may expand or contract over time. Confirmation of the exact location of known sensitive plant sites will occur during planning, treatment, and monitoring of sites.

The only sensitive fungus currently suspected on the Malheur National Forest is the umbrella false-morel (*Pseudorhizina californica*). Fungi only fruit under very specific moisture and temperature conditions. Therefore, it is very difficult to locate species of fungi because of their ephemeral nature. It is very possible that there are undocumented populations of the umbrella false-morel on the Forest.

Some sensitive plant species don't produce above-ground plants every year. These plants include some grape-ferns (*Botrychium spp.*), and many annual species which are dependent upon

sufficient early spring rains, Some of the annual sensitive species include least phacelia (*Phacelia minutissima*), disappearing monkeyflower (*Mimulus evanescens*), dwarf evening-primrose (*Camissonia pygmaea*) annual muhly grass (*Muhlenbergia minutissima*), lowland tooth-cup (*Rotala ramosior*), and desert chaenactis (*Chaenactis xantiana*).

Some species, such as the least phacelia, annual muhly grass, and grapeferns, are so tiny and difficult to find in dense vegetation that even expert botanists may overlook them during surveys. Many of the non-vascular plants are very difficult to identify; it is possible that botanists may also overlook some of these species. For these reasons, it is not possible to state with 100% certainty that all sensitive plant species will be detected during sensitive plant surveys.

Information about the effects of the proposed herbicides on lichens, bryophytes, and fungi is generally lacking. Data on the susceptibility of different nontarget plant species and families to particular herbicides is conducted with agricultural crop species and not those that may better represent nontarget plants in the natural environment.

Spatial and Temporal Context for Effects Analysis

The spatial context for this analysis is the entire area managed by the Malheur National Forest. Invasive species treatments may be prescribed anywhere on the Malheur National Forest. This scale is large enough to identify trends to sensitive species that could result from implementing this project. Since plants do not generally move over large areas quickly, it is not necessary to analyze effects to sensitive plants outside of the National Forest.

The temporal context for effects analysis includes short term and long term effects. Short term effects for this analysis are considered to be one to two years after treatment. Long term effects for this analysis are considered to be longer than two years.

Effects to sensitive plants common to all action alternatives

All action alternatives allow the use of manual, cultural, and mechanical control of invasive species. In addition, all action alternatives allow various amounts of herbicide treatment. Project design features for sensitive plants are the same for all action alternatives. The potential direct and indirect effects discussed here therefore apply to all action alternatives.

Unless otherwise cited, information in this section incorporates by reference analysis discussed in Section 4.3 and Appendix J of the Region 6 Invasive Plant FEIS (R6 2005 FEIS).

All invasive plant treatments are designed to kill or prevent growth and reproduction of target plants. During treatment implementation, direct effects to adjacent non-target plant species may also occur. In most cases, impacts to non-target plants would be minor, and would occur in the immediate vicinity of the treated site. To help minimize effects to sensitive plant species, surveys will be conducted in potential habitat for sensitive plants before treatments. Monitoring and adaptive management are also important components of all alternatives. These will allow for improving project implementation as more information is collected during implementation of the project. In addition project design features should help to reduce the risk of impacts to sensitive plant populations and habitats.

A beneficial indirect effect of proposed treatments is that non-target plants should increase growth and abundance as competition from invasive plants is reduced. This should result in restoration of native plant communities as invasive species are controlled or eliminated. Overall, the short-

term negative effects of treatments are expected to be less than the long-term indirect benefits of removing invasive plants.

Manual and Mechanical Control Effects

All action alternatives include manual and mechanical control. Manual control includes hand pulling, grubbing with tools such as a shovel or hoe, and removing and bagging seed heads. Solarization (covering areas with black plastic) is another manual control technique that is proposed. Mechanical control includes the use of equipment such as mowers or string trimmers.

Control of invasive plants using manual or mechanical methods may potentially directly affect non-target plants. Direct negative effects could include mortality of individuals, reduced vigor due to trampling or removal of above ground parts, and reduced seed production. These effects would be minor with manual control and mechanical control using string trimmers. There would be less ability to target individual plants with mowing, resulting in greater risk of potential negative effects to non-target plants in the treated area.

The project design feature that ensures botanical analysis (including surveys when warranted) before project implementation should greatly reduce the possibility of these activities negatively impacting sensitive plants. Additional protection will be provided by the PDF that will provide for buffers of known sensitive plant sites.

Indirect effects of manual and mechanical methods include soil disturbance and reduced plant cover and shading. Depending on the magnitude of the disturbance, indirect effects could also reduce soil productivity, change soil moisture holding capacity, and may lead to disruption of mycorrhizal and bacterial soil activities, and increases in soil surface temperatures. These changes may promote germination of invasive plant seeds in the seed bank, or provide sites for additional invasive species to become established. Because manual controls would be used primarily on small or low-density infestations of non-rhizomatous species, and mechanical control would be used on selected sites in combination with other methods, these negative effects are likely to be minor. Over time, with repeat treatments, reduction of invasive species through manual and mechanical control would likely provide space for increased germination and growth of native plant species.

Cultural Control Effects

Cultural control techniques proposed in the action alternatives include mulching, seeding, and planting. Direct and indirect effects from these activities are very similar to those from manual and mechanical control. See the section above for details.

Effects of Biological Control Agents

Release of biological control agents would be authorized under all action alternatives. Most of the agents available for control of invasive species have already been released in, or near, the project area, and many are already present on the Forest.

The analyses of the environmental effects of biological control agents have already been completed under documents developed by Agricultural Plant Health and Insect Service (APHIS) for approval of their use. The completed environmental impact statements are available at: http://www.aphis.usda.gov/ppq/enviro_docs/index.html.

Even though control agents are reviewed and approved by APHIS prior to release in this country, there is a slight risk that an approved agent may unintentionally affect native plants or animals.

There also remains the possibility that regardless of what the Forest Service does, unapproved agents or agents known to affect non-targets could spread from neighboring lands onto National Forest System lands.

Herbicide Control Effects

Under alternative A-no action, herbicide use will no longer be authorized on the portions of the Ochoco NF that are administered by the Malheur NF, but may occur along State road rights-of-way and easements as a part of ongoing actions.

All action alternatives include some herbicide control. The action alternatives allow various chemicals and levels of chemical use across the Malheur National Forest. The potential for negative effects from herbicide use increases directly in relation to how many acres are treated, and the toxicity of the various chemicals. Effects on non-target plants will vary based on the herbicide properties, application rate, timing of application, application method, site conditions, and the susceptibility of the non-target plants. Use of non-selective herbicides with residual soil activity and relatively high risk for offsite effects could result in the most damage to non-target plant species. Use of selective herbicides could shift the composition of the plant community, as less tolerant species are replaced by more tolerant species. At many herbicide-treated sites, selective herbicides would result in greater impacts to native broad-leaved forbs than trees, shrubs, or grasses.

The Malheur NF inventory clearly illustrates the association between roads and invasive plant species infestations. The median distance of an invasive plant site to a road is 4 ft. and more that 65% of known invasive plant sites are with 25 ft. of a road center (from GIS mapping layers).

Forest roads facilitate the spread of invasive plants; they have a substantial effect on the establishment and subsequent invasion by providing prime habitat for colonization and serving as corridors for spread. Additionally, other management activities that create soil disturbance are also closely associated with roads. For example, landings, staging areas, livestock handling facilities, and campgrounds are almost always adjacent to roads.

Most sensitive plant sites are not adjacent to roads. Sensitive plants generally require specific microsites that are usually not in disturbed habitats. Most of the sensitive plant habitat within the treatment areas is currently not infested with invasive plants. The fact that there are only eight known populations of sensitive plants within 100 feet of proposed treatment areas illustrates this point. It is possible that there are additional undiscovered populations of sensitive plants in areas that may be treated during the life of this project.

PDFs that restrict herbicide application rates, pre-treatment assessments to confirm sensitive species populations, surveys of high potential sensitive plant habitats, and required monitoring should all greatly reduce the chances of inadvertent spraying of sensitive plant populations. Additional protection will be provided by the PDF that will provide for buffers of known sensitive plant sites. For Alternative C, prescribed no spray buffers along streams, water bodies and riparian areas should further reduce the risk of unintended spraying of sensitive plant populations. The restrictions on use of boom or broadcast spraying in Alternative C should also help to reduce the risk of inadvertent spraying of sensitive plant populations.

Offsite Movement of Herbicides

Although potential for offsite movement varies among herbicides and their application rate, the amounts transported offsite are likely to be quite small. Some plant species are so highly sensitive to certain herbicides that they may be affected by exposure concentrations 100 to 5,000

times less than the typical application rate. The toxicity of herbicides to terrestrial plants is determined by studies of seed emergence, seed germination, and post-emergence applications, using crop and forage plants.

The probability of non-target plants being affected by soil blown from treated sites is low for all herbicides. Potential for wind erosion in the project area is highest on traveled road surfaces and in large burned areas immediately after a fire. Invasive plants generally do not occur on active road surfaces. While invasive plants do invade burned areas, infestations generally arise over a 10-year period, and are not treated the same season as the fire. None of the known treatment sites is considered to have high risk of wind erosion.

Drift could potentially affect non-target plants adjacent to treatment sites; the risk would be greatest during use of picloram and the sulfonylurea herbicides. Offsite drift is a physical process dependent on application rate, droplet size, and weather conditions. To reduce drift, herbicide labels have advisories for wind velocity and nozzle pressure/droplet size. The presence of intercepting vegetation at application sites can also limit drift. Drift is most associated with broadcast, rather than spot applications. Marrs et al. (1989) examined the distances that drift from broadcast applications affected non-target vascular plants and found observations consistent with drift deposition models. The maximum safe distance at which no lethal effects were found was 20 feet, but for most herbicides, the distance was 7 feet or less. Generally, damage symptoms were found at greater distances than lethal effects, but in most cases, there was rapid recovery by the end of the growing season. No effects were seen to non-target vascular plants further than 66 feet from the broadcast treatment zone. Damage to non-target plants outside of treated areas from drift has not been observed at sites on the Forests spot treated with glyphosate or picloram in the past.

The PDF that restricts use of herbicides to no closer than 100 feet from known sensitive plant populations should greatly reduce the chance of negative impacts from herbicide drift.

Runoff could potentially impact germinating seedlings of non-target plants down slope of treatment sites. GLEAMS modeling indicates damage from runoff is most likely to occur under conditions where picloram, imazapyr, or sulfonylurea herbicides are applied to sites with clay soils right before a thunderstorm. The risk on other soil types is low.

Unintended Direct Spray

Unintended direct spray would result in an exposure level equivalent to the application rate, and is much more likely than wind erosion, drift, or runoff to cause impacts to non-target plants. The potential for damage to non-target plants would be greater during broadcast spraying than during spot spraying or wicking, which are much more selective application methods and generally apply less herbicide per acre. Because broadcast applications would be used on dense patches of invasive plants that have few interspersed native species, it is unlikely that substantial impacts to desirable plants would occur. Spot spraying or wicking could damage plants growing immediately adjacent to or among target invasive plants. Monitoring of past spot applications of glyphosate and picloram on other forests has found these techniques to be highly accurate, with most of the visible damage to non-target plants occurring within less than 15 feet of the treated plants (Desser personal communication, 2012, 2013).

Residual Soil Activity

Many herbicides have residual soil activity. Root uptake by nearby non-target plants could result in their damage or mortality. Some herbicides (especially picloram, aminopyralid, imazapyr, and

imazapic) can persist and remain active in soil for two or more seasons. This can prevent germination and establishment of susceptible plants. As noted above, past spot applications of picloram on other Forests have not resulted in observable damage to non-target plants outside of the immediate treated area, either from unintended direct spray or from residual soil activity. The main desire is to recover desired plant communities, and picloram could persist to exclude desired forb type vegetation. However, PDFs (see soils section below) eliminate the potential for herbicide persistence in the soil to have long term effects on native plant communities.

Herbicide Effects to Fungi/Soil Organisms

Herbicides have the potential to affect soil and soil organisms, including fungi. Herbicide effects on soil organisms are not well studied. For the proposed herbicides, risk assessments found typical application rates of picloram could inhibit soil microbial activity, although the indirect effect this would have on non-target plants is not known. Existing studies of herbicide effects on formation of mycorrhizal associations in forest and nursery settings indicate little effect (Busse et al. 2004).

There is only one Sensitive fungal species suspected to occur on the Malheur NF. The umbrella false morel (*Pseudorhizina californica*, formerly known as *Gyromitra californica*) is a fungus that is associated with forest litter, rotting wood, and mineral soil. It is found in riparian areas, coniferous forests, and sometimes in old logging skid trails (Aurora 1986). Habitat for this species is most likely in areas that are not highly susceptible to invasive plant infestations (except in log skidding trails). Although the location of the mycelia of these species is not known in many cases, it is unlikely they occur in areas that would be treated by application of herbicides.

Herbicide Effects to Bryophytes and Lichens

Little information is available about how herbicides may affect lichens and bryophytes. Concerns have been raised about drift from some herbicides decreasing the sustainability, relative long-term abundance, and diversity of lichens and bryophytes (Newmaster et al. 1999; R6 2005 FEIS). Lichens and bryophytes lack roots and instead obtain moisture and nutrients directly from the atmosphere; therefore, they are particularly sensitive and vulnerable to aerosols and contaminants in the atmosphere such as herbicide mist. Sensitive bryophyte and lichen species known to occur on the Malheur NF are generally found in wetlands, on rock surfaces, and in late-successional forest ecosystems.

Potential Effects to Special Forest Products

The main special forest product that is gathered on the Malheur National Forest is firewood. Posts and poles are another important non-timber product. All proposed treatments for invasive plant species should have no effect to opportunities to gather these products. Any potential negative effect would be human exposure to herbicides. The risks of human exposure to herbicides are discussed in other sections of this document.

There is a chance that plants gathered for food and medicinal purposes may be impacted by invasive species treatments. Mechanical, cultural, and herbicide treatments should only minimally impact these plants. This is due to the relatively small areas of treatment, especially when compared to the amount of habitat for these species. The project design feature that dictates the use of blue dye, and public education about the dye, should greatly reduce the risk of human exposure to herbicides when collecting special forest products.

Because the risk of negative impacts to special forest products is so low, the risk from each alternative is determined to be minimal. Therefore, no comparison of the alternatives is needed in

terms of effects to special forest products. Any alternative should not lead to measurable impacts to special forest products.

Potential Effects to Culturally Significant Plants

The mechanical and manual treatment methods are not likely to affect culturally significant plants. Manual methods such as weed pulling allow a great deal of plant specificity and reduce the likelihood of impacts to non-target species. Proposed herbicide treatments have the potential to effect broadleaf species and grasses, potentially including some culturally significant plants. Project design features would help prevent negative impacts to non-target vegetation, including fungi, vascular, and non-vascular plants. Project design features require consultation with affected Tribes as treatments are scheduled so that tribal members may provide input and/or be notified prior to gathering culturally significant plants. Individual culturally significant plant species identified by Tribes, and the public, would be buffered as described for sensitive plants The project design feature that dictates the use of blue dye (PDF F6) and public education about the dye, should greatly reduce the risk of human exposure to herbicides when collecting culturally significant plants.

Discussion of Effects Relative to Different Alternatives

Alternative A – No Action

None of the proposed activities would occur under this alternative, thus there would be no direct or indirect effects to botanical resources from invasive plant treatments. Therefore, implementation of this alternative would have No Impact (NI) to sensitive plants. It also should not lead to any negative impacts to culturally significant plants, special forest products, and/or pollinators.

Since invasive plants often out-compete native plants, the risk to sensitive plants from invasive plants increases with the number of acres of invasive plant infestation. Up to 30,000 acres could be infested over a 15 year period if no treatment occurs and invasive plants spread at a rate of 10 percent per year (see R6 2005 FEIS and ROD and section 3.1.4 for more information on invasive plant spread). Alternative A will not achieve the goal of reducing acreage or suppressing, containing, controlling or eradicating invasive plants.

This alternative would not meet the desired future condition "to retain healthy native plant communities that are diverse and resilient, and restore ecosystems that are being damaged, and to provide high quality habitat for native organisms throughout the forest, and assure that invasive plants do not jeopardize the ability of the forest to provide goods and services communities expect." Invasive species would continue to spread and could eventually adversely impact sensitive species.

Alternative B – Proposed Action

See the discussion above for a description of general effects from the proposed activities for this project. The analysis here is specific to alternative B, the proposed action alternative.

Direct and Indirect Effects

Biological control agents must be rigorously tested for host specificity and approved by APHIS prior to release in the United States. The agents proposed for release meet the host-specificity

requirements of R6 ROD Treatment Restoration Standard 14. There is a slight risk that an approved agent could attack a closely related non-target plant species. There are currently no known threats from biological control agents specific to Malheur NF sensitive species. Therefore, there should be no direct effects from the use of biological control agents to sensitive plant species.

Cultural techniques that include use of seeding and planting of native plants change the species composition at treatment sites. Heavy seeding of native or short-lived non-native grasses could delay germination and growth of other native plants. However, in areas where competitive seeding may be used, the invasive plant infestations are generally so dense that the native plant community has already been drastically altered. Reducing the invasive plants and establishing non-invasive, desirable vegetation would improve the probability that a native community could reestablish over time. Impurities in seed lots could potentially introduce non-native or invasive species, but the requirement to use certified weed-free seed would reduce this risk. Project design features that include surveys and buffers for sensitive plants should greatly reduce the risk that cultural control methods may negatively impact sensitive plants. Therefore, cultural techniques should not have any direct negative impacts to sensitive plant species or habitat.

The use of herbicides could potentially kill sensitive plants. Alternative B proposes treating 2,124 acres per year with herbicides. Common plants near infested areas could be killed; broadcast treatments are the most likely to result in some loss of common native vegetation within 100 feet of target plants. Spot and hand treatments could also kill common plants that are adjacent to treatment sites.

Project design features provide buffers of known sensitive plant sites, and prescribe botanical surveys in riparian and wetland areas with sensitive plant habitat. If any sensitive plants are located during these surveys, mitigations and/or buffers will be used to protect the populations of sensitive plants. These provisions should provide significant protection to both known and undocumented sensitive plant populations in the project area. No treatments are proposed in aquatic habitats, therefore there would be no impact to aquatic sensitive plant species.

Sensitive plant species that occur on cliffs, subalpine areas, and talus slopes have the lowest potential risk from invasive species treatments. This is because these areas are generally not as subject to invasive species infestations as other habitats. In addition, sensitive species that occur strictly in aquatic habitats are also more naturally protected from invasive plant treatments. This is because no treatments are proposed in aquatic habitats. Species that grow in other habitats are at relatively greater risk of impacts from invasive species treatments.

Alternative B would lead to a reduction in the extent and density of invasive plant species in the project area. This should reduce competition and displacement of sensitive plant species over the life of the project. Therefore, the indirect long-term effect of implementation of the alternative B, the proposed action, should lead to a beneficial impact to sensitive plant species in the project area (BI). The degree of this beneficial impact is directly correlated with how many acres of invasive species that are reduced or eliminated.

The requirement that high potential habitat areas proposed for treatment be surveyed for sensitive plants should also provide a large measure of protection for sensitive plant species. However, there is always a small possibility that some populations of sensitive plants may be overlooked during sensitive plant surveys. For this reason, it is not possible to state with 100% certainty that all sensitive plant species will be detected during sensitive plant surveys. There is a slight chance that undetected sensitive plant populations may be negatively impacted by proposed treatments.

Therefore, the direct and indirect effects of Alternative B, the proposed action, on sensitive plant populations and habitat potentially found in treatment areas is that the proposed action may impact individuals or habitat, but will not likely contribute to a trend towards federal listing, or cause a loss of viability to the population or species (MIIH).

Cumulative Effects Analysis

In the past, present, and reasonably foreseeable future, there have been and will continue to be projects and activities within the planning area that may cause impacts to sensitive plants and their habitats on the Malheur National Forest. Projects and activities that reduce native plant cover and create ground disturbance increase the risk of invasive plant infestation. These actions include road construction, timber harvest, fuel reduction treatments (landscape and pile burning, lopping and scattering of slash), fire suppression, recreation, mining and livestock grazing. In addition, restoration efforts such as road decommissioning, and stream improvements also often create newly disturbed ground. See Table 25for a list of future projects that were considered in this analysis.

Road construction and recreation developments have permanently removed native plant habitat in parts of the planning area, and disturbed roadsides continue to be a major conduit for invasive plant spread. Public use of National Forest System lands will likely continue to increase with population growth. This will contribute to the spread of invasive plants along roads and in recreation areas.

Historically, people using pack stock brought hay and feed from other areas for their animals. This feed often contained invasive plant species seed. This contributed to the introduction of new invasive species to the area. In 2009, this potential vector of invasive species has been reduced by regulations that require the use of certified weed free feed for all recreational and permitted stock on the MNF. Region 6 put out a directive on Feb 10, 2009, that states that all forage and mulch used on Forest Service lands shall be certified to be free of noxious weeds (Directive R6-2009-001). The cumulative effect of the provision that requires the use of certified weed free feed for all recreational and permitted stock is that there should be fewer introductions of new invasive weed species and new populations of invasive plants in the planning area. This should help to reduce the long-term risk to sensitive and other plant species of concern.

Past timber harvest created highly disturbed habitat that has remained open and susceptible to infestation for 25-30 years. Disturbance from logging creates bare ground which provides good germination sites for invasive species. Current and planned timber harvest on National Forest System Lands in the project area are mostly thinning treatments with the objective of maintaining mature forest and improving forest health. Harvests are often combined with understory fuels treatments. These activities especially pile burning, also often create bare areas. Current treatments, when compared to past clear cutting, are less likely to create unnaturally large openings, which leads to more bare ground, which provides good germination sites for invasive species. These vegetation management activities have the potential to increase suitable habitat for invasive plant species.

Domestic livestock grazing is a well-documented vector for invasive species seed transport. Livestock grazing has occurred in most of the project area for decades and has resulted in changes in plant communities, especially in non-forested and riparian areas. Grazing has a direct effect on plants through biomass removal and trampling. Grazing can have an indirect effect on plant species by causing soil compaction, soil disturbance, and alteration of nutrient cycling. The degree of impact to plant species from grazing is related to the timing, duration, and intensity of

the grazing action, as well as the individual characteristics and habitat requirements of the species. Grazing may reduce the competitive ability of perennial native grasses in rangeland and meadow habitats and creates localized areas of bare ground susceptible to infestation. Grazing will continue to be a factor in the introduction and spread of invasive plant species. The MNF LRMP (as amended by the R6 2005 ROD) provides several prevention standards to slow the spread of weeds from livestock (see Chapter 3.8 of the DEIS for more information about Range Management).

The historical abundance and distribution of sensitive species on the Forest is not known. Past activities have likely affected their current abundance and distribution. Beginning in approximately 1990, botanical surveys and Biological Evaluations were conducted for most Forest Service projects planned/implemented in the project area. These efforts analyzed effects to species included on the Region 6 sensitive plant list in effect at the time of the analysis. As a result, activities conducted, ongoing, and planned since 1990 have been designed to reduce impacts to sensitive species.

Alternative C- Strict Limitations on Herbicide Use

Direct and Indirect Effects

The main difference between Alternatives B and C is the amount and types of herbicides used. Alternative C will not allow the use of picloram and does not allow broadcast or boom spraying It also will prohibit the use of herbicides within 100 feet of water bodies. The maximum number of acres of herbicide treatment annually is 735 (as compared with the 2,124 acres proposed in Alternative B). The same project design features will apply for sensitive plant populations, with additional protection provided to riparian areas that will be buffered from spraying.

The direct effects for alternative C would be very similar as for alternative B. The main difference is that since there will be less use of herbicide there should be less risk of negative impacts from herbicides relative to alternative B. Since there will be no herbicide treatment within 100 feet of water bodies, there should be no risk from herbicides to sensitive plants that occur within 100 feet of water bodies. Although the risk to sensitive plants is relatively lower under alternative C, the same potential sources of risk still apply. The greatest potential risk of negative impacts to sensitive plant species is due to the possibility of accidentally treating undiscovered populations of rare plants. Therefore, the direct effect of alternative C on sensitive plant populations and habitat potentially found in treatment areas is that the implementation of alternative C may impact individuals or habitat, but will not likely contribute to a trend towards federal listing, or cause a loss of viability to the population or species (MIIH).

Alternative C would lead to a reduction in the extent and density of invasive plant species in the project area. This would reduce competition and displacement of sensitive plant species over the life of the project. Therefore, the indirect long-term effect of implementation of alternative C should lead to a beneficial impact to sensitive plant species in the project area (BI). The degree of this beneficial impact is directly correlated with how many acres of invasive species that are reduced or eliminated. For this reason, Alternative C will not lead to as great of a beneficial long-term impact as Alternative B.

Cumulative Effects

Cumulative effects for alternative C should be similar as for alternative B. See discussion above.

Alternative D- No forest plan amendment, no use of Aminopyralid

Direct and Indirect Effects

Alternatives B and D are similar, however differences in the first year first choice herbicides proposed indirectly influences the herbicide application method Alternative D will not allow the use of herbicides that contain aminopyralid. This would increase the use of other herbicides and increase the acreage that would need to be spot or hand treated due to the buffers. See treatment effectiveness section Chapter 3.1.4 of the DEIS for the consequences of no-broadcast buffers. The maximum number of acres of herbicide treatment annually is 2,124, which is the same as for alternative B. The same project design features will apply for sensitive plant protections.

The direct effects for alternative D should be very similar as for alternative B. The same potential sources of risk to sensitive plants still apply. The greatest potential risk of negative impacts to sensitive plant species is due to the possibility of accidentally treating undiscovered populations of rare plants. The fact that less broadcasting would likely occur would increase operator control and reduce potential for overspray, drift or accidentally impacting sensitive plants.

Therefore, the direct effect of alternative D on sensitive plant populations and habitat potentially found in treatment areas is that implementation of alternative D may impact individuals or habitat, but will not likely contribute to a trend towards federal listing, or cause a loss of viability to the population or species (MIIH).

Alternative D would lead to a reduction in the extent and density of invasive plant species in the project area, however it would take more time compared to Alternative B. This would reduce competition and displacement of sensitive plant species over the life of the project. Therefore, the indirect long-term effect of implementation of alternative D would lead to a beneficial impact to sensitive plant species in the project area (BI). The degree of this beneficial impact is directly correlated with how many acres of invasive species that are reduced or eliminated. For this reason, Alternative D should have a similar level of beneficial impact as Alternative B.

Cumulative Effects

Cumulative effects for alternative D should be similar as for alternative B. See discussion above.

Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

All alternatives for this project comply with Forest Plan Standards and Guidelines and Forest Service direction for management of sensitive plants and special forest products. There is no potential habitat on the Malheur National Forest for any federally listed or proposed plant species. Therefore, there should be no effect from any of the alternatives to federally listed threatened, endangered, or plants proposed for federal listing. Therefore, consultation with the U.S. Fish and Wildlife Service is not necessary for Federally listed or proposed plants.

Although there is a small chance of negative impacts to sensitive plant species from any action alternative selected (MIIH), the potential of negative impacts is relatively small. The areas treated are a very tiny percentage of the known populations and potential habitat for sensitive plants species. Therefore, although the project may impact individuals and habitats for sensitive plants, implementation of any alternative should not result in a trend toward federal listing of any sensitive plant. The selection of any action alternative should not lead to a reduction in the long-term viability of any sensitive plant species on the Malheur NF.

All alternatives should provide for sustained levels of special forest products gathering. All alternatives should allow for the continued viability of pollinators on the Forest.

Table 2: Summary of Effects to Sensitive Plants and Special Forest products

Issue and Indicator	Alternative A	Alternative B	Alternative C	Alternative D
Type and extent of herbicide use within 100 feet of sensitive plants and special forest products	Minimal use of herbicides, no specific project design features for sensitive plants or special forest products.	PDF prohibits broadcast herbicide use within100 feet of sensitive plant populations. Spot applications will be used within 100 feet of sensitive plant populations. PDF for use of blue dye will alert special forest product gatherers of herbicide spray areas.	PDF prohibits broadcast herbicide use within100 feet of sensitive plant populations. Spot applications will be used within 100 feet of sensitive plant populations. PDF for use of blue dye will alert special forest product gatherers of herbicide spray areas.	PDF prohibits broadcast herbicide use within100 feet of sensitive plant populations. Spot applications will be used within 100 feet of sensitive plant populations. PDF for use of blue dye will alert special forest product gatherers of herbicide spray areas.
Effectiveness of buffers and project design features to prevent impacts to non-target vegetation	No current specific buffers or PDFS to prevent impacts to non-target vegetation. No early detection rapid response to new infestations.	Buffers and PDFs should substantially reduce the chance of herbicide use within 100 feet of sensitive plant populations.	Buffers and PDFs should substantially reduce the chance of herbicide use within 100 feet of sensitive plant populations.	Buffers and PDFs should substantially reduce the chance of herbicide use within 100 feet of sensitive plant populations.
Compliance with existing management direction and disclosure of findings	In compliance, but will not achieve goal of adequately treating invasive plants	Meets full compliance	Meets full compliance	Meets full compliance
Determination of short-term effects to Sensitive Plants	Ongoing treatment activities and impacts from spread of invasive species **may impact sensitive plant populations or habitat (MIIH).** Relatively low risk due to current limited use of herbicides.	Uncertainties due to difficulty of location and identification of all populations of sensitive plants leads to a call of **may impact individuals or habitat (MIIH).** Risk is directly correlated with number of acres treated.	Uncertainties due to difficulty of location and identification of all populations of sensitive plants leads to a call of **may impact individuals or habitat (MIIH).** Risk is directly correlated with acres treated. Slightly lower risk than Alternative B due to treating fewer acres, buffers around wet areas, and also not using picloram (which is more persistent in the soil).	Uncertainties due to difficulty of location and identification of all populations of sensitive plants leads to a call of **may impact individuals or habitat (MIIH).** Risk is directly correlated with acres treated. Slightly higher risk than Alternative B due to lower effectiveness of chemicals other than aminopyralid.
Determination of long-term effects to sensitive plants	Reduction in amount and extent of invasive plants should lead to a long term beneficial impact to sensitive plants (BI).	Reduction in amount and extent of invasive plants should lead to a long term beneficial impact to sensitive plants (BI).	Reduction in amount and extent of invasive plants should lead to a long term beneficial impact to sensitive plants (BI).	Reduction in amount and extent of invasive plants should lead to a long term beneficial impact to sensitive plants (BI).

Additional Design Feature and Monitoring Recommendations

No additional design features are recommended for sensitive plants, special forest products, or culturally significant plants.

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Glossary

Key words and definitions

APHIS - Animal and Plant Health Inspection Service. Part of the U.S. Department of Agriculture.

EDRR - Early detection, rapid response.

Effects Determination for Federally Listed Plants

No Effect (NE) - Occurs when a project or activity will not have any "effect" on a listed species, or critical habitat.

May Effect - Likely To Adversely Affect (LAA) - If the determination in the biological assessment (or Biological Evaluation) is that the project May Effect - Likely To Adversely Affect a listed species or critical habitat, formal consultation must be initiated (50 CFR 402.12).

May Effect - Not Likely To Adversely Affect (NLAA) - If it is determined in the biological assessment (or Biological Evaluation) that there are "effects" to a listed species or critical habitat, but that those effects are not likely to adversely affect listed species or critical habitat, then written concurrence by the FWS or NMFS is required to conclude informal consultation (50 CFR 402.13).

Beneficial Effect (BE) – Occurs when a project or activity is determined to positively impact listed species or critical habitat. Written concurrence is also required from the FWS or NMFS if a beneficial effect determination is made.

Effects Determination for Forest Service Sensitive Plants

No Impact (NI) - A determination of "No Impact" for sensitive species occurs when a project or activity will have no environmental effects on habitat, individuals, a population or a species.

May impact individuals or habitat (MIIH) - May impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species. Activities or actions that have effects that are immeasurable, minor or are consistent with Conservation Strategies would receive this conclusion.

Will impact individuals or Habitat (WIFV) – Will impact individuals or habitat with a consequence that the action may contribute to a trend towards federal listing or cause a loss of viability to the population or species. Loss of individuals or habitat can be considered significant when the potential effect may be: 1. Contributing to a trend toward Federal listing (C-1 or C-2 species); 2. Results in a significantly increased risk of loss of viability to a species; or, 3. Results in a significantly increased risk of loss of viability to a significant population

Beneficial impact (BI) - Projects or activities that are designed to benefit, or that measurably benefit a sensitive species

Groundwater Loading Effects of Agricultural Management Systems (GLEAMS) - Herbicide effects to stream aquatic resources from ground-based application methods were analyzed for each of the herbicides included in the Proposed Action using the GLEAMS chemical fate model. This model displays herbicide concentrations in streams under a variety of conditions.

No-Observed-Effect-Level (NOEL) - Exposure level at which there are no statistically or biological significant differences in the frequency or severity of any effect in the exposed or control populations.

Sensitive Plant Species – Sensitive plant species are defined as those plant species identified by a Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density and habitat capability that would reduce a species' existing distribution (FSM 2670.5). Management of sensitive species "must not result in a loss of species viability or create significant trends toward federal listing" (FSM 2670.32). The term sensitive plant species as used here includes vascular plants, non-vascular plants (mosses and liverworts), lichens, and fungi.